CLAIMS

What is claimed is:

1. A fluid ejection device comprising:

a first heater element;

a second heater element vertically spaced a first distance from the first heater element;

a first drive transistor associated with the first heater element; and

a second drive transistor associated with the second heater element, the second drive transistor vertically spaced a second distance from the first drive transistor, the second distance being different than the first distance.

2. The fluid ejection device of Claim 1, wherein the first distance is greater than the second distance.

3. The fluid ejection device of Claim 2, further comprising a primitive group of drive transistors, wherein the primitive group of drive transistors comprises the first and second transistors.

4. The fluid ejection device of Claim 1, wherein the first distance is less than the second distance.

5. The fluid ejection device of Claim 4, further comprising a first primitive group of drive transistors and an adjacent second primitive group of drive transistors, wherein the first primitive group comprises the first drive transistor and the second primitive group comprises the second drive transistor.

6. The fluid ejection device of Claim 1, wherein the first distance is a heater element centerline-to-centerline spacing, and the second distance is a transistor center-to-centerline spacing.

7. A fluid ejection device comprising:

a plurality of drive transistors; and

a corresponding plurality of associated firing heater elements;

wherein the plurality of drive transistors are spaced more closely with respect to each other than the plurality of associated firing heater elements are spaced with respect to each other.

8. The fluid ejection device of Claim 7, further comprising a primitive group, the primitive group comprising the plurality of drive transistors and the plurality of firing heater elements.

9. The fluid ejection device of Claim 8, wherein the plurality of drive transistors comprise contacts, the fluid ejection device further comprising:

a layer of metal disposed over each of the contacts of the primitive group.

10. The fluid ejection device of Claim 9, wherein the layer of metal comprises a power buss connected to each of the plurality of drive transistors.

11. The fluid ejection device of Claim 9, wherein the layer of metal is disposed over an entire surface of each of the contacts of the primitive group.

12. The fluid ejection device of Claim 7, wherein the plurality of drive transistors are arranged in a column of drive transistors and the plurality of associated firing heater elements are arranged in a column of firing heater elements alongside the column of drive transistors.

13. The fluid ejection device of Claim 12, further comprising a primitive group, the primitive group comprising the plurality of drive transistors and the plurality of firing heater elements.

14. The fluid ejection device of Claim 13, wherein the plurality of drive transistors comprise contacts and further comprising:

a layer of metal disposed over each of the contacts.

15. The fluid ejection device of Claim 14, wherein the layer of metal comprises a power buss connected to each of the plurality of drive transistors.

16. The fluid ejection device of Claim 14, wherein the layer of metal is disposed over an entire surface of each of the contacts of the primitive group.

17. The fluid ejection device of Claim 8, wherein the primitive group is a first primitive group; and further comprising a second primitive group adjacent the first primitive group, the second primitive group comprising a second plurality of drive transistors and a second plurality of firing heater elements, wherein the second plurality of drive transistors are spaced more closely with respect to each other than the second plurality of firing heater elements are spaced with respect to each other.

18. The fluid ejection device of Claim 17, wherein the first primitive group comprises an adjacent pair of drive transistors spaced a first distance apart from each other; and

the first primitive group is separated from the second primitive group a second distance, the second distance being greater than the first distance.

19. The fluid ejection device of Claim 17, wherein a first spacing between transistors in the first primitive group is different from a second spacing between transistors in the second primitive group.

20. A fluid ejection device comprising:

a vertical column of firing heater elements and a vertical column of associated drive transistors; wherein

a first firing heater element of the vertical column of firing heater elements is vertically separated centerline-to-centerline by a first distance from an associated first drive transistor; and

an adjacent second firing heater element of the vertical column of firing heater elements is vertically separated centerline-to-centerline by a second distance from an associated second drive transistor,

wherein the first distance and second distance are different

21. The fluid ejection device of Claim 20 further comprising:

a primitive group comprising a plurality of firing heater elements of the vertical column of firing heater elements and a plurality of associated drive transistors of the vertical column of drive transistors;

wherein the primitive group comprises the first and second firing heater elements and the associated first and second drive transistors.

22. The fluid ejection device of Claim 21, wherein the drive transistors of the primitive group are spaced more closely center line-to-centerline along the vertical column of drive transistors than the firing heater elements of the primitive group are spaced from centerline-to-centerline along the vertical column of firing heater elements.

23. The fluid ejection device of Claim 21, wherein the plurality of firing heater elements of the primitive group are uniformly spaced from each other by a distance V1 and the plurality of drive transistors are uniformly spaced from each other by a distance V2, the distance V2 being less than V1.

24. The fluid ejection device of Claim 23, wherein the distance V1 provides a fluid ejection device resolution of 1200 dots per inch.

25. The fluid ejection device of Claim 20 further comprising:

a primitive group comprising the vertical column of firing heater elements and the vertical column of drive transistors;

a power buss associated with the primitive group and electrically connected to provide a common power source for all of the plurality of drive transistors;

wherein the primitive group comprises the first and second firing heater elements and the associated first and second drive transistors.

26. The fluid ejection device of Claim 25, wherein the drive transistors of the primitive group are spaced more closely center line-to-centerline along the vertical column of drive transistors than the firing heater elements of the primitive group are spaced centerline-to-centerline along the vertical column of firing heater elements.

27. The fluid ejection device of Claim 25, wherein the plurality of firing heater elements of the primitive group are uniformly spaced a distance V1 and the plurality of drive transistors are uniformly spaced a distance V2, the distance V2 being less than V1.

28. The fluid ejection device of Claim 25, wherein the power buss has a perimeter defining an area, the plurality of drive transistors each have contacts and the contacts of the plurality of drive transistors are all enclosed within the perimeter.

29. The fluid ejection device of Claim 28, wherein the drive transistors of the primitive group are spaced more closely centerline-to-centerline along the vertical column of drive transistors than the firing heater elements of the primitive group are spaced centerline-to-centerline along the vertical column of firing heater elements.

30. The fluid ejection device of Claim 28, wherein the plurality of firing heater elements of the primitive group are uniformly spaced a distance V1 and the plurality of drive transistors are uniformly spaced a distance V2, the distance V2 being less than V1.

31. The fluid ejection device of Claim 20 comprising:

a first primitive group comprising a first plurality of firing resistors of the column of firing resistors and a first plurality of associated drive transistors of the column of drive transistors;

an adjacent second primitive group comprising a second plurality of firing heater elements of the column of firing heater elements and a second plurality of drive transistors of the column of drive transistors;

first and second electrical power busses, each power buss associated with the drive transistors of the first or second primitive group

respectively and electrically connected to the first or second plurality of drive transistors of the respective first or second primitive group respectively and electrically isolated from the other power buss.

32. The fluid ejection device of Claim 31, wherein the first plurality of drive transistors of the first primitive group are spaced more closely from each other center line-to-centerline along the vertical column of drive transistors than the first plurality of firing heater elements of the first primitive group are spaced centerline-to-centerline along the vertical column of firing heater elements; and

the second plurality of drive transistors of the second primitive group are spaced more closely from each other center line-to-centerline along the vertical column of drive transistors than the second plurality of firing heater elements of the second primitive group are spaced centerline-to-centerline along the vertical column of firing heater elements.

33. The fluid ejection device of Claim 31, wherein the first plurality of firing heater elements of the first primitive group are uniformly spaced a distance V1 and the first plurality of drive transistors of the first primitive group are uniformly spaced a distance V2, the distance V2 being less than V1.

34. The fluid ejection device of Claim 31, wherein:

a lowermost drive transistor of the first primitive group is vertically spaced centerline-to-centerline a distance V3 from an uppermost drive transistor of the adjacent second primitive group; and

the drive transistors of one of the first or second primitive groups are vertically spaced more closely than the distance V3.

35. The fluid ejection device of Claim 34, wherein the first plurality of drive transistors of the first primitive group are spaced more closely center line-to-centerline along the vertical column of drive transistors than the first plurality of firing heater elements of the first primitive group are spaced centerline-to-centerline along the vertical column of firing heater elements; and

the second plurality of drive transistors of the second primitive group are spaced more closely center line-to-centerline along the vertical column of drive transistors than the second plurality of firing heater elements of the second primitive group are spaced centerline-to-centerline along the vertical column of firing heater elements.

36. The fluid ejection device of Claim 34, wherein the first plurality of firing heater elements of the first primitive group are uniformly spaced a distance V1 apart from each other and the first plurality of drive transistors of the first primitive group are uniformly spaced a distance V2 apart from each other, the distance V2 being less than V1 and the distance V1 being less than the distance V3.

37. A method of manufacturing a fluid ejection device, comprising:

disposing a plurality of drive transistors on a substrate, the drive transistors each comprising contacts; and

disposing a metal layer over the contacts; and

wherein the plurality of drive transistors comprises a primitive group of drive transistors, and wherein the metal layer comprises a power buss covering each of the contacts of the primitive group of drive transistors.

38. The method of Claim 37, further comprising a surface etch with an etchant.

39. The method of Claim38, wherein the etchant comprises TMAH.

40. The method of Claim 38, wherein the power buss is disposed prior to the etch.

41. A method of manufacturing a fluid ejection device, comprising:

fabricating a vertical column of drive transistors on a substrate, the drive transistors having contacts and the vertical column of drive transistors comprising a primitive group of drive transistors;

fabricating a power buss over the contacts of the drive transistors of the primitive group; and.

wherein the power buss has a perimeter defining an area, the area enclosing the contacts of the drive transistors of the primitive group.

42. The method of Claim 41, further comprising a surface etch with an etchant.

43. The method of Claim 42, wherein the etchant comprises TMAH.

44. The method of Claim 42, wherein the power buss is fabricated prior to the etch.